

THE IMPACT OF THE CONVENTION ON SUPPLEMENTARY COMPENSATION FOR NUCLEAR DAMAGE

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This Note analyzes the impact of the Convention on Supplementary Compensation for Nuclear Damage (CSC) in light of the dual purposes of international agreements on civil liability for nuclear damages, ensuring victim compensation for transnational damages and safeguarding the long-term viability of the nuclear power industry from liability for nuclear accidents by establishing rules to control industry liability. Particular emphasis is placed on the impact of the CSC on the two major users of nuclear power in the CSC, the United States, and Japan. While there are valid concerns about the provisions of all international agreements on nuclear liability, including the CSC, this paper argues that the CSC effectively controls industry liability but will likely prove to be of little impact for domestic victims in either the United States, or Japan.

I. INTRODUCTION.....	313
II. PROVISIONS AND HISTORY	315
III. U.S. NUCLEAR DAMAGE COMPENSATION SYSTEM	333
IV. JAPANESE NUCLEAR DAMAGE COMPENSATION SYSTEM	337
V. ANALYSIS OF THE CSC'S PROVISIONS	341
A. Definition of Damages	342
B. Limitations on Liability.....	344
C. Legal Channeling.....	348
D. Statute of Limitations	349
E. Jurisdiction over Claims.....	350
VI. REFORM EFFORTS	351

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I. INTRODUCTION

With Japan's ratification of the International Atomic Energy Agency (IAEA)-affiliated Convention on Supplementary Compensation for Nuclear Damage (CSC) on January 15, 2015, the CSC took effect on April 15, 2015, the newest international agreement in the labyrinthine world of nuclear damage compensation agreements.¹ International agreements on civil liability for nuclear damages, of which the CSC is one, are designed to ensure victim compensation for transnational damages and safeguard the long-term viability of the nuclear power industry from liability for nuclear accidents by establishing rules to control industry liability.² This paper analyzes the impact of the CSC in light of these two purposes, with particular emphasis on the impact of the CSC on the two major users of nuclear power in the CSC, the United States and Japan. The main proponents of the CSC are national governments, who highlight its ability to be a truly global treaty system, promote victim compensation through provisions stronger than other treaties which have taken effect, and control industry liability.³ Critics of the CSC such as Prof. Currie and the Japan Federation of Bar Associations assert that, while it provides better protection for victims than some

¹ Convention on Supplementary Compensation for Nuclear Damage, Sept. 29, 1997, 36 I.L.M. 1473 (entered into force Apr. 15, 2015), <https://www.iaea.org/sites/default/files/infirc567.pdf> [<https://perma.cc/YNK2-D27Q>] [hereinafter CSC]; *Latest Status of the Convention on Supplementary Compensation for Nuclear Damage*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Apr. 21, 2015), https://www.iaea.org/Publications/Documents/Conventions/supcomp_status.pdf [<https://perma.cc/K8Z7-JFHK>] [hereinafter CSC Latest Status]; *Japan Joins the Convention on Supplementary Compensation for Nuclear Damage*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Jan. 16, 2015), <https://www.iaea.org/newscenter/news/japan-joins-convention-supplementary-compensation-nuclear-damage> [<https://perma.cc/4CAU-MYBK>].

² Julia Schwartz, *International Nuclear Third Party Liability Law: The Response to Chernobyl*, in INTERNATIONAL NUCLEAR LAW IN THE POST-CHERNOBYL PERIOD, ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT NUCLEAR ENERGY AGENCY [NEA], at 37, 39 (2006), <https://www.oecd-neo.org/law/chernobyl/nea6146-iaea-chernobyl.pdf> [<https://perma.cc/UK48-CUJU>].

³ S. EXEC. DOC. NO. 109-15, at 1–2 (2006), <https://www.congress.gov/109/crpt/erpt15/CRPT-109erpt15.pdf> [<https://perma.cc/QPK5-QLLX>]; Terabayashi Yūsuke (寺林裕介), *Genshiryoku Songai Hokanteki Hoshō Joyaku (CSC) Teiketsu ni tsuite* (原子力損害補完の補償条約 (CSC) 締結について) [*Regarding Accession to the Convention on Supplementary Compensation for Nuclear Damage (CSC)*], 361 RIPPŌ TO CHŌSA (立法と調査) [LEGISLATION AND SURVEYS] 42, 53 (2015), http://www.sangiin.go.jp/japanese/annai/chousa/rippou_chousa/backnumber/20150202042.pdf [<https://perma.cc/WWT7-23UQ>] [hereinafter House of Councilors Report].

other treaties, limits on damages, concentration of claims in the country in which an accident occurs, short statutes of limitations, and poor membership in the treaty systems mean that it is still deficient.⁴

While there are valid concerns about the provisions of all international agreements on nuclear liability, including the CSC, this paper argues that the CSC effectively controls industry liability but will likely prove to be of little impact for domestic victims in either the United States or Japan. The provisions of international agreements which limit liability for nuclear damages by concentrating liability on operators of nuclear reactors are favorable to exporters of nuclear technology. However, the CSC also does not substantially alter the compensation system for domestic accidents for victims in the United States or Japan because it only establishes minimum standards which national legislation can and does exceed in both and United States and Japan and provides a relatively minor amount of additional compensation. In addition, both states are less likely to suffer transnational nuclear damages due to their comparatively isolated geographical location as compared to European states.

First this paper will examine the history of international agreements on civil liability for nuclear damages, reviewing the terms of the three treaty systems, the Paris Convention, the Vienna Convention and the CSC and investigating the reasons that states join, or do not join, these regimes. Second, this paper will describe the U.S. system for the compensation of nuclear damage and the changes made to it to implement the CSC. Third, this paper will do the same for the Japanese nuclear damage compensation system. Fourth, this paper will then show how the CSC protects the nuclear industry from heavy liability but does little to expand victim protection. Lastly this

⁴ Duncan E. J. Currie, *The Problems and Gaps in the Nuclear Liability Conventions and an Analysis of How an Actual Claim Would Be Brought under the Current Existing Treaty Regime in the Event of a Nuclear Accident*, 35 DENV. J. INT'L L. & POL'Y 85, 85 (2006); "Genshiryoku Songai no Baishō ni kansuru Hōritsu" oyobi "Genshiryoku Songai no Hokanteki Hoshō ni kansuru Jōyaku" ni kansuru Ikensho (「原子力損害の賠償に関する法律」及び「原子力損害の補完的補償に関する条約」に関する意見書) [*Opinion on the "Act of Compensation for Nuclear Damage" and "Convention on Supplementary Compensation for Nuclear Damage"*], NIHON BENGOSHI RENGŌKAI (日本弁護士連合会) [JAPAN FEDERATION OF BAR ASSOCIATIONS] (Aug. 22, 2014), at 1, http://www.nichibenren.or.jp/library/ja/opinion/report/data/2014/opinion_140822_3.pdf [<https://perma.cc/F2M4-A5MF>] [hereinafter August 2014 JFBA Opinion].

paper will introduce the IAEA's suggestions for improving the current regime.

II. PROVISIONS AND HISTORY

This section will introduce the provisions and history of the CSC and the Conventions which proceeded it, the Paris Convention, the Brussels Supplementary Compensation, and the Vienna Convention, noting the current fragmented nature of the network of international agreements and how this limits their utility. This section will also show how the diverse interests of the parties caused this fragmentation. A more focused analysis of how the terms of the CSC accomplish the goals of international agreements on civil liability and change the nuclear damage compensation systems of the United States and Japan will be conducted later in this paper.

As previously mentioned, such international agreements are designed to address the compensation of transnational damages.⁵ In a world without international agreements addressing liability for transnational nuclear damage, liability would be governed by the domestic law of the nations involved. Most nations have laws that remove liability for damage from nuclear power from the normal law of tort and concentrate liability on the operator of the nuclear power plant.⁶ At the outset of the nuclear age in the 1950s and 1960s, states interested in promoting the peaceful use of atomic energy determined that the ordinary rules of tort law would on one hand inhibit victims from showing which parties were liable for their harm and on the other expose nuclear operators, builders, and suppliers, etc., to uninsurable liability.⁷ As such, they established certain common basic principles of liability for nuclear damages: (i) operators of nuclear power plants should be exclusively liable for nuclear damages, (ii) they should be strictly liable for nuclear damages, (iii) their liability should be limited in amount, (iv) their liability must be financially secured, for example through insurance, and (v) their liability should be limited in time.⁸ The earliest example of this was

⁵ Schwartz, *supra* note 2, at 39.

⁶ *Id.*

⁷ *Id.*

⁸ Schwartz, *supra* note 2, at 39–41.

the 1957 Price-Anderson Act in the United States.⁹ Japan passed its Act on Compensation for Nuclear Damage in 1963.¹⁰ These two pieces of legislation have similarities, but differ in several important respects which will be discussed in detail later in this paper.

From these early days of the development of nuclear power some nations, in particular the densely populated nations of Western Europe with many neighboring states, have desired to address the potential mess of conflicting laws that would govern a nuclear accident that caused transnational damages by entering into international agreements that delineate which state's law will apply to an accident as the rules on conflicts of laws differ between states.¹¹ The core features of such agreements are that they (i) provide that the law governing liability for nuclear damages is the law of the state in which the nuclear accident occurred, (ii) provide for exclusive jurisdiction over claims regarding liability for such accident in the courts of the state in which the accident occurred, and (iii) require that parties to the agreement bring their domestic law into conformance with principles mentioned above, though the precise requirements vary in important respects.¹² Also, some international agreements only cover nuclear damage suffered in states party to the agreement in question.¹³

The first such agreement was the Paris Convention, open only to OECD members or other states as allowed by a vote of the members of the OECD, which was signed in 1960 and took effect in 1968.¹⁴ Membership of the Paris Convention focuses in Europe.¹⁵ It

⁹ Act to Amend the Atomic Energy Act of 1954 (Price-Anderson), Pub. L. No. 85-256, 71 Stat. 576 (1957).

¹⁰ Genshiryoku Songai no Baishō ni kansuru Hōritsu (原子力損害の賠償に関する法律) [Act on Compensation for Nuclear Damage], Law No. 147 of 1961, <http://law.e-gov.go.jp/htmldata/S36/S36HO147.html> [<https://perma.cc/GX86-MWSJ>] (Japan) [hereinafter ACND].

¹¹ Schwartz, *supra* note 2, at 41.

¹² *Id.* at 43.

¹³ *Id.*

¹⁴ Convention on Third Party Liability in the Field of Nuclear Energy, July 29, 1960, 956 U.N.T.S. 251 (entered into force Apr. 1, 1968), <http://treaties.un.org/doc/publication/units/volume%20956/volume-956-i-13706-english.pdf> [<https://perma.cc/9T8R-TP3M>] [hereinafter Paris Convention].

¹⁵ *Paris Convention on Nuclear Third Party Liability: Latest Status of Ratifications or Accessions*, ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT NUCLEAR ENERGY AGENCY [NEA] (July 30, 2015), <https://www.oecd-neo.org/law/paris-convention-ratification.html> [<https://perma.cc/9WF6-HX66>] [hereinafter Paris Convention Latest Status].

was followed shortly thereafter by the Vienna Convention, an agreement open to any state, which was signed in 1963 and took effect in 1977.¹⁶ Vienna Convention membership concentrates in Latin America and the Middle East.¹⁷ The Paris Convention was also strengthened by the Brussels Supplementary Convention, which created the first framework for a supplementary compensation fund consisting of contributions from state parties in the event of nuclear damage in excess of the minimum amount of liability an operator would be subject to under the Paris Convention.¹⁸ However, the United States was unable to join either Convention without significant amendments to U.S. law because of several differences between U.S. law and the requirements for entry to the two Conventions.¹⁹

These agreements are still the bedrock of the international regime for the compensation for transnational nuclear damages and a brief review of their core terms is necessary in understanding the role of the CSC.²⁰ Both treaties are only applicable only within the territory of the contracting parties.²¹ Jurisdiction over claims arising under the Conventions lies only with the courts of the contracting party in which the nuclear incident occurred.²² Judgments entered by the competent court generally must be recognized and enforced by all

¹⁶ Vienna Convention on Civil Liability for Nuclear Damage, May 21, 1963, 1063 U.N.T.S. 265, <https://www.iaea.org/sites/default/files/infcirc500.pdf> [<https://perma.cc/9L9D-9LM9>] (entered into force Nov. 12, 1977) [hereinafter Vienna Convention].

¹⁷ *Latest Status of the Vienna Convention on Civil Liability for Nuclear Damage*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Jan. 27, 2014), https://www.iaea.org/Publications/Documents/Conventions/liability_status.pdf [<https://perma.cc/7RGV-RCDB>] [hereinafter Vienna Convention Latest Status].

¹⁸ Convention of 31st January 1963 Supplementary to the Paris Convention of 29th July 1960 on Third Party Liability in the Field of Nuclear Energy, Jan. 31, 1963, 1041 U.N.T.S. 358 (entered into force Dec. 4, 1974), <http://www.nea.fr/html/law/nlbrussels.html> [<https://perma.cc/A7Y2-WQC2>] [hereinafter Brussels Supplementary Convention].

¹⁹ U.S. DEP'T OF ENERGY, REPORT TO CONGRESS ON THE PRICE-ANDERSON ACT 25 (1999), <https://energy.gov/sites/prod/files/gcprod/documents/paa-rep.pdf> [<https://perma.cc/B5H3-LQ58>] [hereinafter 1999 DOE Report].

²⁰ The Paris Convention has sixteen parties with a total of 116 of the world's 443 civilian nuclear power plants. The Vienna Convention has forty parties with a total of seventy-six civilian nuclear power plants. Paris Convention Latest Status, *supra* note 15; Vienna Convention Latest Status, *supra* note 17; *Operational Reactors by Country*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Feb. 14, 2016), <https://www.iaea.org/PRIS/WorldStatistics/OperationalReactorsByCountry.aspx> [<https://perma.cc/ENE3-AME8>].

²¹ Paris Convention, *supra* note 14, art. 2; Vienna Convention, *supra* note 16, art. 11.

²² Paris Convention, *supra* note 14, art. 13(a); Vienna Convention, *supra* note 16, art. 11.

contracting parties.²³ The Convention and national law must be applied without discrimination based on nationality, domicile or residence.²⁴ The Conventions define operator liability for nuclear damages as being for damage to or loss of life of any person and damage to or loss of property which is caused by a nuclear incident, except the operator's property at the site of the nuclear installation.²⁵ Both Conventions provide for the strict and exclusive of liability of nuclear operators for nuclear damages where causation can be proved, with exceptions only for damage caused by nuclear incidents relating to acts of war or insurrection or, unless national legislation of the installation states otherwise, a grave natural disaster of an exceptional character.²⁶ The Paris Convention provides that states may limit liability to not less than 5 million Special Drawing Rights (SDR) with the International Monetary Fund (IMF) but not more than 15 million SDR, and the Vienna Convention provides that states may limit liability to not less than U.S. \$5 million.²⁷ Financial security must be provided by the nuclear operator in such amount.²⁸ The statute of limitations on claims for compensation is generally 10 years from the date of the incident, unless national law of a contracting party provides for insurance coverage for a longer period.²⁹ The law of the competent court may provide for a statute of limitations of not less than three years from the date the victim had or should have had knowledge of the damage and the identity of the operator liable for the damage under the Paris Convention, and not less than two years

²³ Paris Convention, *supra* note 14, art. 13(d); Vienna Convention, *supra* note 16, art. 12.

²⁴ Paris Convention, *supra* note 14, art. 14(a); Vienna Convention, *supra* note 16, art. 13.

²⁵ Paris Convention, *supra* note 14, arts. 1, 4; Vienna Convention, *supra* note 16, arts. 1(j), 2.

²⁶ Paris Convention, *supra* note 14, art. 4; Vienna Convention, *supra* note 16, art. 2.

²⁷ Paris Convention, *supra* note 14, art. 7; Vienna Convention, *supra* note 16, art. 5. Regarding SDR, see *Rule O—Valuation of the SDR, Valuation of Currencies in Terms of the SDR, Freely Usable Currency, and Operational Budget*, INT'L MONETARY FUND, <https://www.imf.org/external/pubs/ft/bl/r15.htm> [<https://perma.cc/YRJ6-Q5DC>] (last visited Jan. 15, 2017). One SDR is equal to approximately U.S. \$1.35, as of January 2017. *SDR Valuation*, INT'L MONETARY FUND, https://www.imf.org/external/np/fin/data/rms_sdrv.aspx [<https://perma.cc/4NZ4-R8RG>] (last visited Jan. 15, 2017, 2016).

²⁸ Paris Convention, *supra* note 14, arts. 10(a), 15; Vienna Convention, *supra* note 16, art. 7.

²⁹ Paris Convention, *supra* note 14, art. 8(a); Vienna Convention, *supra* note 16, art. 6.

under the Vienna Convention.³⁰ Nuclear operators have a right of recourse against third parties only where explicitly provided for by written agreement or where the accident was caused by the intentional act of an individual.³¹

The Brussels Supplementary Convention, which limits membership to states also party to the Paris Convention, provides for two additional tiers of government funds for compensation beyond the first tier of compensation required in the Paris Convention in the event of an accident.³² The second tier is composed of public funds provided by the installation state in which an accident occurred in the amount of the difference between 175 million SDR and the minimum liability amount established by the installation state.³³ The third tier is a fund of 125 million SDR provided by all contracting parties according to a pre-determined formula.³⁴

Chernobyl brought home the need for such agreements. The 1986 Chernobyl accident caused massive transnational nuclear damages, but it took place in the USSR, which was not party to any international agreement, had no special legislation on nuclear damages, and asserted it that it had no duty to provide compensation under international law.³⁵ While damages from Chernobyl were incurred as far away as the United States and Japan, the European states suffered the most damage and in the aftermath of the accident they moved to both expand the number of states party to international agreements and to make it easier for victims to recover for nuclear damages under the existing agreements.³⁶

One of the first measures was the ratification of the 1988 Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention, which grants coverage to a state party to it under the convention to which it is not already a party (either the Paris or Vienna Convention) and ensures that only one of either the Paris Convention or Vienna Convention will apply to a nuclear incident.³⁷

³⁰ Paris Convention, *supra* note 14, art. 8(c); Vienna Convention, *supra* note 16, art. 6(c).

³¹ Paris Convention, *supra* note 14, art. 6(f); Vienna Convention, *supra* note 16, art. 10.

³² Brussels Supplementary Convention, *supra* note 18, art. 3(a).

³³ Brussels Supplementary Convention, *supra* note 18, art. 3(b).

³⁴ Brussels Supplementary Convention, *supra* note 18, art. 3(b).

³⁵ Schwartz, *supra* note 2, at 37–38.

³⁶ *Id.* at 43–44.

³⁷ Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention, Sept. 21, 1988, 1672 U.N.T.S. 293 (entered into force Apr. 27, 1992),

Subsequently, proposals would be made to amend the Paris Convention, Vienna Convention, and Brussels Supplementary Convention in response to criticism that limits on liability under existing agreements were too low, that an additional compensation fund was necessary to cover damages in excess of operator liability, that existing statutes of limitations were too short, that additional types of damages must be covered, and that territorial scope should be widened.³⁸

Also, the United States was interested in joining an international regime covering liability for transnational nuclear damage but was unable to join either the Paris or Vienna Convention as U.S. law channels operator liability differently than the Conventions do and U.S. limits on liability are considerably higher than in either Convention.³⁹ In the opinion of the Department of Energy, joining the CSC was meant to address concerns about ensuring compensation for nuclear accidents that occurred outside the United States and also promote commercial opportunities for U.S. firms to assist in the development of the safe use of nuclear power in developing states by providing them with the same rules channeling liability as firms from competing European states and Russia which were parties to the Paris and Vienna Conventions.⁴⁰ Other states recognized that there would need to be a grandfather clause allowing the United States to join the CSC, a major goal if the agreement were to have global acceptance since the United States is the largest user

<http://treaties.un.org/doc/Publication/UNTS/Volume%201672/v1672.pdf> [https://perma.cc/9NQB-CURE] [hereinafter Joint Protocol]. See generally Schwartz, *supra* note 2, at 45.

³⁸ Protocol to Amend the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as amended by the Additional Protocols of 28 January 1964 and by the Protocol of 16 November 1982, Feb. 12, 2004, <http://www.oecd-nea.org/law/paris-convention-protocol.html> [https://perma.cc/J87W-45WE] (has not entered force) [hereinafter 2004 Protocol to Amend Paris Convention]; Protocol to Amend the Convention of 31 January 1963 Supplementary to the Paris Convention of 29 July 1960 on Third Party Liability in the Field of Nuclear Energy, as amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982, Feb. 12, 2004 [hereinafter 2004 Protocol to Amend Brussels Supplementary Convention], http://www.oecd-nea.org/law/brussels_supplementary_convention.pdf [https://perma.cc/8HLS-YDTN] (has not entered force); Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, Sept. 29, 1997, 2241 U.N.T.S. 302 (entered into force Oct. 4, 2003), <http://treaties.un.org/doc/Publication/UNTS/Volume%202241/v2241.pdf> [https://perma.cc/V653-E4KT] [hereinafter 1997 Revised Vienna Convention]; Currie, *supra* note 4, at 107.

³⁹ 1999 DOE Report, *supra* note 19, at 25.

⁴⁰ *Id.*

of nuclear power.⁴¹ This was uncontroversial and the United States would play a critical role in the negotiations, preparing what would be the basis for the ultimate text of the CSC.⁴²

Despite a general consensus about the need for a more globally accepted regime with stronger victim protection provisions, amending the Conventions was a messy and drawn out process due to the conflicting interests of the parties. As the Paris Convention was not designed to be open to non-OECD members, the IAEA-affiliated Vienna Convention was addressed first, with the CSC, also developed under the aegis of the IAEA, being negotiated simultaneously and with the intent that it both complement the Vienna Convention in the manner the Brussels Supplementary Convention complements the Paris Convention and act as a more broadly applicable third treaty regime.⁴³ The terms of the agreements are designed to be as similar as possible to promote the adoption of both. Negotiations began on these two agreements in 1990.⁴⁴

The Explanatory Texts to the Revised Vienna Convention and the CSC point out several areas of conflict during negotiations. The parties were not in agreement on the new, expanded definition of damages, largely as a result of different treatments in national law of economic losses and environmental damages.⁴⁵ Also, while there was general agreement that the limits on compensation should be increased in the Vienna Convention and CSC, the amount the limits should be increased was so controversial it was left until the final stage of negotiations and eventually phase-in periods with reduced minimum liability amounts were adopted.⁴⁶ Furthermore, one group of countries wanted to expand the geographical scope of coverage of damage to damage wherever suffered, not just the territory of the parties to the Convention, but this was controversial as it was seen to reduce the amount of compensation available for victims in the parties to the Convention, though it is also precisely the problem that

⁴¹ Int'l Atomic Energy Agency [IAEA], *The 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage—Explanatory Texts*, at 64–65, IAEA Doc. STI/PUB/1279 (2007), http://www-pub.iaea.org/MTCD/publications/PDF/Pub1279_web.pdf [<https://perma.cc/6PAM-T4W9>] [hereinafter Vienna Convention/CSC Explanatory Texts].

⁴² *Id.* at 65.

⁴³ Schwartz, *supra* note 2, at 46.

⁴⁴ Vienna Convention/CSC Explanatory Texts, *supra* note 41, at 34.

⁴⁵ *Id.* at 34.

⁴⁶ *Id.* at 43, 77.

arose in the Chernobyl accident.⁴⁷ Lastly, the terms of the supplementary compensation fund in the CSC were the most heavily debated provision.⁴⁸ Originally the idea of a supplementary tier of compensation to which all parties would be required to contribute was rejected in the 1963 Vienna Convention because it was thought that such a provision would not be widely accepted since the primary beneficiaries of the fund would be victims in the state in which an accident took place.⁴⁹ Nuclear states, in particular the U.K. and France, objected to the reservation of funds in the supplementary fund for transnational damages because it violated the principle of non-discrimination in the distribution of damages and was perceived as being unconstitutional in some states.⁵⁰ Furthermore, non-nuclear states, namely New Zealand, objected to being required to make contributions to the supplementary fund as any nuclear accident could not be their fault.⁵¹

A protocol to amend the Vienna Convention and the draft of the CSC were agreed in 1997.⁵² The Vienna Convention was the first of the original Conventions for which an amendment was proposed, and is the only one for which the amendment has taken effect.⁵³ The minimum liability amount for nuclear operators was increased from U.S. \$ 5 million to 300 million SDR.⁵⁴ The statute of limitations for compensation claims for loss of life or personal injury was extended to 30 years and priority is given to such claims in the distribution of compensation where claims are brought within 10 years.⁵⁵ The scope of compensable damages was expanded to cover a variety of additional environmental and economic damages, using the same

⁴⁷ *Id.* at 29.

⁴⁸ *Id.* at 19, 63.

⁴⁹ *Id.* at 63.

⁵⁰ *Id.*

⁵¹ *Id.* at 79.

⁵² Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, Sept. 29, 1997, 2241 U.N.T.S. 302 (entered into force Oct. 4, 2003), <https://www.iaea.org/sites/default/files/infocirc566.pdf> [<https://perma.cc/YR8E-8XHX>] [hereinafter 1997 Revised Vienna Protocol].

⁵³ Vienna Convention Latest Status, *supra* note 17; *Latest Status of the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Nov. 26, 2015), https://www.iaea.org/Publications/Documents/Conventions/protamend_status.pdf [<https://perma.cc/WF7V-EBMT>] [hereinafter Revised Vienna Convention Latest Status].

⁵⁴ 1997 Revised Vienna Protocol, *supra* note 52, art. 7.

⁵⁵ 1997 Revised Vienna Protocol, *supra* note 52, art. 8.

definition as the CSC (detailed below).⁵⁶ The territorial scope of the Vienna Convention was extended to nuclear damage wherever suffered, though contracting parties may exclude damage suffered in non-contracting parties and their territorial waters by national legislation if such non-contracting party does not provide equivalent reciprocal benefits.⁵⁷ Also, the exception to liability for grave natural disasters was removed.⁵⁸

As discussed above, the CSC is designed to both be a third nuclear damage liability regime open to states not party to either the Paris or Vienna Conventions as long as their national law met basic criteria and also serve as the equivalent of the Brussels Supplementary Convention for the parties of the Vienna Convention.⁵⁹ The CSC provides for a minimum national compensation amount of at least 300 million SDR and a supplementary compensation fund of about 300 million SDR contributed by the parties to the CSC which is to be drawn on by the installation state in which an accident occurred to compensate victims of a nuclear incident in the event that the first tier funds are exhausted.⁶⁰ Contributions to the supplementary fund are based about 90% on the nuclear power generating capacity of each party with the remainder based on the UN assessment of each party.⁶¹

The CSC defines nuclear damages to include (a) loss of life or personal injury, (b) loss of or damage to property.⁶² The following are also included to the extent determined by the law of the competent court: (i) economic loss arising from the above (a) or (b), (ii) environmental reinstatement costs that are actually incurred or will be incurred, (iii) loss of income incurred as a result of a significant impairment of the environment, (iv) preventative measures, and (v)

⁵⁶ 1997 Revised Vienna Protocol, *supra* note 52, art. 2. This definition is the same as that used in the CSC and will be discussed in further detail in the analysis of the provisions of the CSC.

⁵⁷ 1997 Revised Vienna Protocol, *supra* note 52, art. 3.

⁵⁸ 1997 Revised Vienna Protocol, *supra* note 52, art. 6.

⁵⁹ CSC, *supra* note 1, art. 2; *Japan Joins the Convention on Supplementary Compensation for Nuclear Damage*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Jan. 16, 2015), <https://www.iaea.org/newscenter/news/japan-joins-convention-supplementary-compensation-nuclear-damage> [<https://perma.cc/4CAU-MYBK>].

⁶⁰ CSC, *supra* note 1, arts. 3, 4.

⁶¹ CSC, *supra* note 1, art. 4(1)(a).

⁶² CSC, *supra* note 1, art. 1(f)(i–ii).

any other economic loss permitted by the law of civil liability of the competent court.⁶³

Exclusive jurisdiction over claims brought under the CSC generally belongs to the courts of the party within whose territory or waters the incident occurs, with certain narrow exceptions.⁶⁴ Compensation must be distributed equitably without discrimination on the basis of nationality, domicile or residence, though states may exclude nuclear damage suffered in a non-Contracting State subject to the limitations of other Conventions.⁶⁵ Regarding compensation from the international supplementary compensation fund, compensation will only be provided for damage suffered in the territory of a party or other area with one of several possible sufficient connections to that state, such as its EEZ.⁶⁶ 50% of the compensation provided through the international supplementary compensation fund is prioritized for damage suffered outside of the territory of the installation state unless the state provides for not less than 600 million SDR of compensation under national law.⁶⁷

Parties to the CSC which are not also parties to either the Paris Convention or Vienna Convention must have national law consistent with the following principles, which are based on the Paris and Vienna Conventions.⁶⁸ Liability for nuclear damage must be strictly and exclusively concentrated on the operator of the nuclear reactor which caused nuclear damage.⁶⁹ There are exceptions to operator liability for nuclear damage directly due to an act of war or insurrection or, except where the law of the installation state provides otherwise, directly due to a grave natural disaster of an exceptional character.⁷⁰ Operator liability may be limited to as little as 300 million SDR and operators must maintain financial security in such amount.⁷¹ If a state does not limit operator liability, then the amount of financial security may not be less than 300 million SDR.⁷² The period of extinction for claims under the CSC is generally 10 years,

⁶³ CSC, *supra* note 1, art. 1(f)(iii–vii).

⁶⁴ CSC, *supra* note 1, art. 13(1).

⁶⁵ CSC, *supra* note 1, art. 3(2)(a).

⁶⁶ CSC, *supra* note 1, art. 5.

⁶⁷ CSC, *supra* note 1, art. 11.

⁶⁸ CSC, *supra* note 1, art. 2(1).

⁶⁹ CSC, *supra* note 1, Annex art. 3.

⁷⁰ CSC, *supra* note 1, Annex art. 3(5).

⁷¹ CSC, *supra* note 1, Annex art. 4–5.

⁷² CSC, *supra* note 1, Annex art. 5.

however if under national law the liability of the operator is covered by insurance or other financial security or by State funds for a period longer than ten years this period may be extended up to the period for which the operator's liability is covered.⁷³ The law of the competent court may establish a period of prescription or extinction of not less than three years from the date a person suffering nuclear damage had knowledge of the damage and the operator liable for the damage.⁷⁴ The right of recourse of the operator against a third party is limited to cases where this is expressly provided for by written agreement or intentional acts or omissions by an individual.⁷⁵

In 2004 the parties to the Paris Convention and the Brussels Supplementary Convention agreed on protocols to amend both Conventions.⁷⁶ These Protocols met with a decidedly unenthusiastic response and have not been ratified, but their proposed amendments are of value in analyzing the CSC as they provide for more compensation, but make it available to fewer victims and for fewer types of damages.⁷⁷ The minimum liability amount in the Paris Convention was raised, generally, to € 700 million from the previous maximum of 15 million SDR, and the exception to liability for grave natural disasters of an exceptional character was removed.⁷⁸ The territorial scope of the Paris Convention was extended to include nuclear damage wherever suffered, though contracting parties may exclude with national legislation damage suffered in non-contracting parties if such non-contracting party does not provide equivalent reciprocal benefits.⁷⁹ The Protocol added a definition of damages that is largely the same as that of the 1997 Revised Vienna Protocol, though it can be read to be somewhat more restrictive of economic loss.⁸⁰ The statute of limitations on compensation claims for loss of

⁷³ CSC, *supra* note 1, Annex art. 9(1).

⁷⁴ CSC, *supra* note 1, Annex art. 9(3).

⁷⁵ CSC, *supra* note 1, Annex art. 10.

⁷⁶ 2004 Protocol to Amend Paris Convention, *supra* note 38; 2004 Protocol to Amend Brussels Supplementary Convention, *supra* note 38.

⁷⁷ Paris Convention Latest Status, *supra* note 15; *Brussels Supplementary Convention: Latest Status of Ratifications or Accessions*, ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT NUCLEAR ENERGY AGENCY [NEA] (Mar. 18, 2014), <https://www.oecd-neo.org/law/brussels-convention-ratification.html> [https://perma.cc/6B7L-F3H5] [hereinafter *Brussels Supplementary Convention Latest Status*].

⁷⁸ 2004 Protocol to Amend Paris Convention, *supra* note 38, art. 1(H, J).

⁷⁹ 2004 Protocol to Amend Paris Convention, *supra* note 38, art. 1(C).

⁸⁰ 2004 Protocol to Amend Paris Convention, *supra* note 38, art. 1(B); Schwartz, *supra* note 2, at 54–55.

life or personal injury was extended to 30 years.⁸¹ The Protocol to Amend the Brussels Supplementary Convention increased the second tier of damages (provided by the installation state) from 175 million SDR to € 500 million, and the third tier (provided by all contracting parties) from 125 million SDR to € 300 million.⁸² Unlike the Protocol to Amend the Paris Convention, in the Protocol to Amend the Brussels Supplementary Convention the territorial scope of damages covered is expanded only to cover the exclusive economic zone and continental shelf of contracting parties, not damages wherever suffered.⁸³ This is because the compensation provided in the second and third tiers is provided by public funds and the parties didn't want to make it so widely available.⁸⁴

Of the Revised Paris and Vienna Conventions, only the Revised Vienna Convention was actually ratified, and only by 13 parties as compared to the 40 parties of the original Vienna Convention.⁸⁵ The reaction to the CSC was likewise less than enthusiastic. Only 13 states signed the CSC shortly after its publication, and only Argentina, Morocco, and Romania actually ratified the CSC shortly after signing it.⁸⁶ Many signatories never ratified it, or took many years to ratify it, like the United States.⁸⁷ This meant that initially the CSC could not take effect, as it required ratification by at least five states with a combined 400,000 megawatts (MW) of installed nuclear power generating capacity.⁸⁸

While the United States played a key role in the drafting of the CSC, it took until 2008 for the CSC to be ratified by the United States.⁸⁹ Part of the initial delay was because the CSC requires membership in the Convention on Nuclear Safety, which the United States was not a party to at the time the CSC opened for signature,

⁸¹ 2004 Protocol to Amend Paris Convention, *supra* note 38, art. 1(I).

⁸² 2004 Protocol to Amend Brussels Supplementary Convention, *supra* note 38, art. 3.

⁸³ 2004 Protocol to Amend Brussels Supplementary Convention, *supra* note 38, art. 2.

⁸⁴ Schwartz, *supra* note 2, at 55.

⁸⁵ Vienna Convention Latest Status, *supra* note 17; Revised Vienna Convention Latest Status, *supra* note 53; Paris Convention Latest Status, *supra* note 15; Brussels Supplementary Convention Latest Status, *supra* note 77.

⁸⁶ CSC Latest Status, *supra* note 1.

⁸⁷ *Id.*

⁸⁸ CSC, *supra* note 1, art. 20.

⁸⁹ CSC Latest Status, *supra* note 1.

but ratified in 1999.⁹⁰ The CSC was eventually presented by President Bush to the Senate for ratification in 2002.⁹¹ Committee hearings began in 2005 and the CSC received the advice and consent of the Senate in 2006.⁹² The Senate noted that the CSC would ensure “prompt and adequate compensation” to victims of nuclear disasters and address the civil liability faced by U.S. exporters of nuclear technology.⁹³ In ratifying the CSC, the United States emphasized that the CSC was consistent with the Price-Anderson Act and it balanced victim compensation with industry liability risks.⁹⁴ Of particular importance was the fact the CSC had the potential for global acceptance.⁹⁵

However the CSC was caught up in the process of amending energy law more generally, with a piece of omnibus legislation that included the implementing legislation for the CSC being hotly debated by both Houses of Congress and the Bush Administration, in particular over provisions relating to climate change and oil industry subsidies.⁹⁶ The result of this was that the Senate passed implementing legislation for the CSC several times, but the House of Representatives rejected these bills until it passed an omnibus energy bill called the Energy Independence and Security Act in 2007.⁹⁷

Debate over the CSC in the United States was framed in the context of a push by the Bush Administration to expand the use of nuclear power in the United States and abroad as a clean power source.⁹⁸ U.S. construction of nuclear power plants slowed dramatically after the 1970s as no new plants were ordered between 1973 and 2012, though the NRC now has 12 applications for licenses

⁹⁰ CSC, *supra* note 1, art. 18; *Latest Status of the Convention on Nuclear Safety*, INT’L ATOMIC ENERGY AGENCY [IAEA] (Apr. 23, 2015), https://www.iaea.org/Publications/Documents/Conventions/nuclearsafety_status.pdf [<https://perma.cc/C3CU-WNEM>].

⁹¹ Senate Consideration of Treaty Document 107-21, U.S. CONG., <https://www.congress.gov/treaty-document/107th-congress/21> [<https://perma.cc/E3NG-P7AS>] (last visited Jan. 15, 2017).

⁹² *Id.*

⁹³ S. EXEC. DOC. NO. 109-15, *supra* note 3, at 1–2.

⁹⁴ *Id.* at 2.

⁹⁵ *Id.*

⁹⁶ FRED SISSINE, CONG. RESEARCH SERV., RL34294, ENERGY INDEPENDENCE AND SECURITY ACT OF 2007: A SUMMARY OF MAJOR PROVISIONS 1–2 (2007).

⁹⁷ Nuclear Regulation Committee, *Report of the Nuclear Regulation Committee*, 29 ENERGY L. J. 789 (2008).

⁹⁸ *Solution to Greenhouse Gases Is New Nuclear Plants, Bush Says*, N.Y. TIMES (May 25, 2006), <http://www.nytimes.com/2006/05/25/washington/25bush.html> [<https://perma.cc/7Q6M-JJK6>].

to operate nuclear power plants.⁹⁹ The nuclear industry has also become much more globalized, with operator and supplier networks for U.S. nuclear plants no longer controlled by U.S. firms, with substantial cooperation between U.S. and Japanese firms.¹⁰⁰ However, the level of U.S. exports of nuclear plant components, equipment, fuel, and technology had held steady since the mid-1990s, but U.S. market share has fallen significantly.¹⁰¹ Nevertheless, the 21st Century has seen a rise in countries both large and small express interest in developing nuclear power plants.¹⁰² U.S. nuclear supplier Westinghouse had plans for 14 new nuclear reactors in China alone in the early 2000s and China had proposals for up to 80 more.¹⁰³ In addition, India had plans for 12 plants.¹⁰⁴

Japan did not sign the CSC in 1997.¹⁰⁵ Initially, Japan considered the CSC unattractive because Japanese law was seen as providing a higher level of protection of victims, the Japanese government did not consider it likely that Japan would be involved in a nuclear accident with transnational effects, and none of Japan's neighbors were party to any of the Conventions.¹⁰⁶

Japan's interest in the CSC reemerged in the aftermath of the 2011 Great East Japan Earthquake, culminating in Japan's ratification of the CSC in 2015.¹⁰⁷ With Japan's ratification, the parties that had ratified the CSC collectively possessed over 400,000 MW of installed nuclear capacity and the CSC took effect in April 2015.¹⁰⁸ According to a report produced by the House of Councilors, Japan's change in position was due to a revaluation of the risks of nuclear power and renewed interest in providing legal predictability for the nuclear industry.¹⁰⁹ This report also emphasized that ratifying the CSC

⁹⁹ PAUL K. KERR, CONG. RESEARCH SERV., MARY BETH K. NIKITIN & MARK HOLT, R41910, NUCLEAR ENERGY COOPERATION WITH FOREIGN COUNTRIES: ISSUES FOR CONGRESS 7–8 (2014).

¹⁰⁰ *Id.* at 8.

¹⁰¹ *Id.* at 6.

¹⁰² *Id.* at 3.

¹⁰³ *Id.* at 20.

¹⁰⁴ *Id.*

¹⁰⁵ CSC Latest Status, *supra* note 1.

¹⁰⁶ House of Councilors Report, *supra* note 3, at 52–53.

¹⁰⁷ *Id.*

¹⁰⁸ CSC Latest Status, *supra* note 1; *Operational Reactors by Country*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Feb. 14, 2016), <https://www.iaea.org/PRIS/WorldStatistics/OperationalReactorsByCountry.aspx> [<https://perma.cc/ENE3-AME8>].

¹⁰⁹ House of Councilors Report, *supra* note 3, at 52–53.

would make it easier for the United States to provide assistance in the clean-up efforts at the Fukushima Daiichi reactor by assuaging the concerns about liability of U.S. firms.¹¹⁰ The report also put particular emphasis on a belief that the modest terms of the CSC would help promote its adoption by the developing states of Asia that were endeavoring to launch a nuclear power industry.¹¹¹ Indeed the IAEA notes that 60 countries are considering constructing nuclear power plants, and the IAEA forecasts that 10 to 24 countries will bring plants online by 2030.¹¹² The Ministry of Foreign Affairs (MOFA) phrased Japan's reasons for adopting slightly differently.¹¹³ The Ministry of Foreign Affairs (MOFA) advocated joining the CSC because it would enable a contribution to building an international compensation system for nuclear damages, improve compensation in the event of a nuclear accident, ensure swift and fair aid to victims, and improve in legal predictability by enacting international rules and improve the environment for related industries.¹¹⁴ MOFA has also emphasized the fact that the CSC is more compatible with the ACND, for example as regards definitions of damages and exceptions to liability, and that membership in the Paris and Vienna Conventions was concentrated in regions nowhere near Japan.¹¹⁵ Prof. Takashima suggests several additional reasons for Japan's shift in position: the nuclear renaissance in Asia, the restructuring in the nuclear industry through acquisitions and collaboration in which Japanese industry has taken part, and the fact that the United States, with which the Japanese nuclear industry has close ties, joined the CSC system and was attempting to bring it into effect.¹¹⁶ There was also supposition

¹¹⁰ *Id.*

¹¹¹ *Id.*

¹¹² Yukiya Amano, *Statement to Nuclear Power Forum*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Dec. 10, 2010), <https://www.iaea.org/newscenter/statements/statement-nuclear-power-forum> [https://perma.cc/24FQ-F45U].

¹¹³ *Genshiryoku Songai no Hokantekina Hoshō ni kansuru Jōyaku no Gaiyō* (原子力損害の補完的な補償に関する条約の概要) [*Outline of the Convention on Supplementary Compensation for Nuclear Damage*], JAPAN MINISTRY OF FOREIGN AFFAIRS (Jan. 15, 2015), <http://www.mofa.go.jp/mofaj/files/000057321.pdf> [https://perma.cc/B4D7-HSNT].

¹¹⁴ *Id.*

¹¹⁵ *Id.*

¹¹⁶ Takashima Tadayoshi (高島忠義), *Fukushima Dai'ichi Genpatsu Jiko to Kokusai Hō* (福島第一原発事故と国際法) [*The Fukushima Daiichi Nuclear Plant Accident and International Law*], in SHINSAI GENPATSU JIKO TO KANKYŌ HŌ (震災・原発事故と環境法) [EARTHQUAKES, NUCLEAR ACCIDENTS AND ENVIRONMENTAL LAW] 236 (Shigeru Takahashi & Tadashi Otsuka eds. 2013), <http://webcatplus.nii.ac.jp/webcatplus/details/book/25710935.html> [https://perma.cc/5Y98-9MJ5].

in the press that U.S. and Japanese firms were trying to compensate for declines in domestic performance with exports to developing countries.¹¹⁷

Given the numerous, fundamental disagreements on the terms of the Revised Vienna Convention and the CSC even between the negotiating parties, it is unsurprising that ratification has not proceeded smoothly. Nevertheless, the difficulty in gathering significant membership in any single treaty regime limits the utility of all of the treaties, including the CSC.¹¹⁸ As mentioned previously, states have long looked for a mechanism to clarify what law will apply when there are transnational damages from a nuclear accident and to ensure that their citizens obtain compensation for those damages.¹¹⁹ If there are insufficient parties to the Conventions then these objectives cannot be achieved, as was realized after the Chernobyl accident.¹²⁰ Indeed with membership fragmented between multiple conventions this problem largely remains.

At present the membership in the Conventions is as follows. There are nine parties to the CSC, sixteen parties to the Paris Convention, and forty parties to the Vienna Convention (only 13 ratified the Revised Vienna Convention).¹²¹ However the United States (99 reactors), Japan (43 reactors, many inactive pending approval), and India (22 reactors), all with substantial nuclear power industries, are party to the CSC.¹²² In total the parties to the CSC operate 169 reactors, the parties to the Paris Convention 116 reactors, and the parties to the Vienna Convention 76 reactors.¹²³ Of the major nuclear powers, Canada, China (including Taiwan), South Korea, and

¹¹⁷ *Fukushima Fires up Atomic Industry's Removal-of-Liability Drive*, BLOOMBERG BUS. (June 13, 2014), <http://www.bloomberg.com/news/articles/2014-06-12/japan-may-ratify-atomic-treaty-for-u-s-aid-in-fukushima-cleanup> [https://perma.cc/CX6A-EDE5].

¹¹⁸ Schwartz, *supra* note 2, at 50–51.

¹¹⁹ *Id.* at 41.

¹²⁰ *Id.* at 43–44.

¹²¹ CSC Latest Status, *supra* note 1; Paris Convention Latest Status, *supra* note 15; Vienna Convention Latest Status, *supra* note 17.

¹²² CSC Latest Status, *supra* note 1; *Operational Reactors by Country*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Feb. 14, 2016), <https://www.iaea.org/PRIS/WorldStatistics/OperationalReactorsByCountry.aspx> [https://perma.cc/ENE3-AME8].

¹²³ *Operational Reactors by Country*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Feb. 14, 2016), <https://www.iaea.org/PRIS/WorldStatistics/OperationalReactorsByCountry.aspx> [https://perma.cc/ENE3-AME8].

Switzerland are not party to any Convention, and they collectively operate 92 reactors.¹²⁴

It is therefore important to examine the reasons why membership in the Conventions has not grown. One reason for failure of nuclear power generating countries to join the CSC was preferential treatment of plaintiffs from outside a state's borders in distributions from the supplementary compensation fund.¹²⁵ This was one of the matters of dispute during the negotiation process.¹²⁶ In addition, nuclear states objected to reserving half of the supplementary fund for transnational damages which may have occurred in states not party to the CSC.¹²⁷ The drafting process also revealed disagreement on the proper scope of compensable damages.¹²⁸ There also was disagreement over whether to cover damages wherever suffered, as the Vienna Convention does, or only in the parties to the Convention, as the CSC does.¹²⁹ Furthermore, the parties to the Brussels Supplementary Convention, including France and the U.K., felt it would be too complex and duplicative to be part of both systems considering the different provisions of the agreements.¹³⁰ Russian representatives have voiced concern that the presence of the CSC as a third legal regime to excessively fragment the legal framework.¹³¹ Furthermore, the increased minimum liability amounts have encountered stiff resistance among the European states, and they were not even able to get sufficient ratification of the amended Paris Convention.¹³² For non-nuclear states, such as Austria and New Zealand, the provisions concentrating liability on nuclear operators and relieving suppliers of liability have precluded their ratification of any international agreement on this subject as they see such provisions as being overly protective of the nuclear industry.¹³³ Furthermore, Europe is generally turning away

¹²⁴ Schwartz, *supra* note 2, at 57.

¹²⁵ *Id.* at 52.

¹²⁶ Vienna Convention/CSC Explanatory Texts, *supra* note 41, at 63.

¹²⁷ *Id.*

¹²⁸ *Id.* at 34.

¹²⁹ *Id.* at 29.

¹³⁰ Schwartz, *supra* note 2, at 52.

¹³¹ *Looking at Supplementary Compensation for Nuclear Damage*, LAW360 (Dec. 4, 2014), <http://www.law360.com/articles/600893/looking-at-supplementary-compensation-for-nuclear-damage> [<https://perma.cc/AZW6-EZG7>].

¹³² Schwartz, *supra* note 2, at 43, 77.

¹³³ *Id.* at 59.

from nuclear power. Germany has decided to phase out nuclear power.¹³⁴ Italian voters rejected a bid by the government to revive nuclear power generation after a moratorium on new plants was put in place in the 1980s.¹³⁵

However there has been a new wave of interest in the modern agreements on the part of states interested in building a domestic nuclear power industry, with 4 states (including Japan) ratifying the CSC and 8 states ratifying the Revised Vienna Convention since 2010.¹³⁶ Many U.S. companies will only agree to export to parties to the CSC.¹³⁷ The U.A.E., for example, acceded to the Revised Vienna Convention in 2012,¹³⁸ and the CSC in 2014,¹³⁹ after signing a contract for four nuclear reactors, notably with a South Korean firm not a U.S. firm, highlighting the role of the CSC as a part of the U.A.E.'s commitment to the safe development of nuclear power.¹⁴⁰ In addition, India, keen to expand its use of nuclear power to meet its surging electricity demand, ratified the CSC in February 2016.¹⁴¹ Negotiations had gone on for over 10 years with U.S. firms balking at Indian law which held suppliers liable for damages due to manufacturing defects and refusing to export to India unless India ratified the CSC.¹⁴² While membership in the Conventions is expanding somewhat, it is still far from the ideal of a global regime imagined in the aftermath of the Chernobyl accident.

¹³⁴ *Goodbye Nuclear Power: Germany's Renewable Energy Revolution*, GUARDIAN (May 10, 2013), <http://www.theguardian.com/sustainable-business/nuclear-power-germany-renewable-energy> [https://perma.cc/G47D-XE63].

¹³⁵ *Italy Says No*, WORLD NUCLEAR NEWS (June 14, 2011), http://www.world-nuclear-news.org/NP_Italy_says_no_1406111.html [https://perma.cc/M6DJ-3H4T].

¹³⁶ CSC Latest Status, *supra* note 1; Revised Vienna Convention Latest Status, *supra* note 77.

¹³⁷ KERR, NIKITIN & HOLT, *supra* note 99, at 22.

¹³⁸ Revised Vienna Convention Latest Status, *supra* note 77.

¹³⁹ CSC Latest Status, *supra* note 1.

¹⁴⁰ *UAE Signs International Nuclear Liability Pact*, WORLD NUCLEAR INSTITUTE (July 10, 2014), <http://www.nei.org/News-Media/News/News-Archives/UAE-Signs-International-Nuclear-Liability-Pact> [https://perma.cc/2TRL-8F8S].

¹⁴¹ *India's Nuclear Ambitions Boosted with Global Liability Pact*, BLOOMBERG NEWS (Feb. 4, 2016), <http://www.bloomberg.com/news/articles/2016-02-05/india-s-nuclear-ambitions-boosted-by-joining-liability-pact> [https://perma.cc/TJS8-MATZ].

¹⁴² *Id.*; KERR, NIKITIN & HOLT, *supra* note 99, at 20.

III. U.S. NUCLEAR DAMAGE COMPENSATION SYSTEM

Before analyzing how well the CSC accomplishes its twin goals of promoting victim compensation and shielding operators from unbearable liability for accidents, a background in U.S. and Japanese law on the compensation of nuclear damage is necessary as these are the two main population centers in the CSC when it took effect. In the United States, liability for nuclear damage is governed by the 1957 Price-Anderson Act (1957), which has been amended about every ten years since its passage and undergone significant changes since its passage.¹⁴³

The Price-Anderson Act defines the liability of anyone liable for “public liability,” which is defined as “any legal liability arising out of or resulting from a nuclear incident or precautionary evacuation.”¹⁴⁴ This definition means that, in addition to the nuclear operator, other parties, such as suppliers, are still liable for nuclear damage, but the liability is channeled to the operator because these other parties are indemnified by the nuclear operator under his insurance coverage.¹⁴⁵ This is termed economic channeling, in contrast to the international standard of legal channeling discussed previously, in which the nuclear operator is deemed solely liable for all damages and nuclear damage is removed by statute from normal tort law.¹⁴⁶

Under the Price-Anderson Act, unless there is an “extraordinary nuclear occurrence” (ENO), nuclear operators are subject to the ordinary standards of liability.¹⁴⁷ Unless the Nuclear Regulatory Commission (NRC) determines that there was an ENO, plaintiffs generally need to show that the damage caused to them was due to negligence or some other wrongful act unless state law

¹⁴³ Act to Amend the Atomic Energy Act of 1954 (Price-Anderson), Pub. L. No. 85-256, 71 Stat. 576 (1957); Pub. L. No. 89-645, 80 Stat. 891 (1966); Pub. L. No. 94-197, 89 Stat. 1111 (1975); Pub. L. No. 100-408, 102 Stat. 1066 (1988); Pub. L. No. 109-58, 119 Stat. 779 (2005); Michael Faure & Tom Vanden Borre, *Compensating Nuclear Damage: A Comparative Economic Analysis of the U.S. and International Liability Schemes*, 33 WM. & MARY ENVTL. L. & POL’Y REV. 219, 240 (2008) (providing a detailed description of the Price-Anderson Act).

¹⁴⁴ 42 U.S.C. § 2014(w) (2005).

¹⁴⁵ Faure & Borre, *supra* note 143, at 242.

¹⁴⁶ *Id.*

¹⁴⁷ 42 U.S.C. § 2014(hh).

provides otherwise.¹⁴⁸ The NRC has issued regulations defining an ENO based on criteria regarding radiation dose received, contamination levels for certain isotopes, and monetary damages.¹⁴⁹

The Price-Anderson Act allows the NRC to issue regulations requiring nuclear operators to waive certain tort law defenses to liability, de facto imposing strict liability.¹⁵⁰ The NRC has issued regulations which apply this provision through the contractual terms of the indemnity agreements which nuclear operators are required to conclude with the NRC.¹⁵¹ The indemnity agreement requires licensees to waive:

(1) Any issue or defense as to the conduct of the claimant or the fault of the insureds, including but not limited to:

(i) Negligence,

(ii) Contributory negligence,

(iii) Assumption of risk, and

(iv) Unforeseeable intervening causes, whether involving the conduct of a third person, or an act of God,

(2) Any issue or defense as to charitable or governmental immunity, and

(3) Any issue or defense based on any statute of limitations if suit is instituted within three (3) years from the date on which the claimant first knew, or reasonably could have known, of his bodily injury or property damage and the cause thereof, but in no event

¹⁴⁸ Ken Lerner & Edward Tanzman, *Making Victims Whole: Compensation of Nuclear Incident Victims in Japan and the United States*, 17 N.Y.U. J. LEGIS. & PUB. POL'Y 543, 562 (2014).

¹⁴⁹ 10 C.F.R. §§ 140.84, 140.85 (2002).

¹⁵⁰ 42 U.S.C. § 2014 (n). See also Faure & Borre, *supra* note 143, at 241–42.

¹⁵¹ 10 C.F.R. 140.91 (2016).

more than twenty (20) years after the date of the nuclear incident.¹⁵²

If the NRC does not declare an accident to be an ENO then claims are brought as normal under state law. The NRC did not declare the Three Mile Island accident to have been an ENO and claimants needed to prove a breach of duty, but subsequently most states have imposed strict liability by statute.¹⁵³

The Price-Anderson Act requires nuclear operators to “have and maintain financial protection of such type and in such amounts” as the NRC requires, currently \$375 million for reactors licensed to produce 100,000 kilowatts or more.¹⁵⁴ Nuclear operators are also required to maintain secondary financial protection in the form of an industry retrospective rating plan in the event public liability from a single accident exceeds the primary coverage of the operator involved.¹⁵⁵ The amount of this secondary coverage is a maximum of \$95 million dollars per accident (adjusted for inflation), plus an additional 5% to cover legal costs.¹⁵⁶ The maximum amount of retroactive premium that can be assessed for a single accident is currently \$121.255 million.¹⁵⁷ At present there are 104 reactors in the pool, so there is the potential for a pool of about \$12.61 billion per incident, which combined with the insurance policy of the operator creates a total pool of \$ 12.985 billion.¹⁵⁸ However, no operator will be required to pay more than an inflation adjusted \$15 million per year (currently \$18.963 million).¹⁵⁹ If the amount of claims in a given year exceeds the pool of funds available to pay such claims, the NRC will obtain funds from Congress or the Treasury to advance the amount of payable claims and later recover the amounts from the nuclear operators.¹⁶⁰

¹⁵² *Id.*

¹⁵³ Lerner & Tanzman, *supra* note 148, at 562–63.

¹⁵⁴ 42 U.S.C. § 2210 (2006); 10 C.F.R. 140.11(a)(4) (2016).

¹⁵⁵ 42 U.S.C. § 2210(b)(1).

¹⁵⁶ 42 U.S.C. §§ 2210(b)(1), (o)(1)(E).

¹⁵⁷ 10 C.F.R. 140.11(a)(4).

¹⁵⁸ See *Backgrounder on Nuclear Insurance and Disaster Relief*, U.S. NUCLEAR REG. COMM’N (December 12, 2014), <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/nuclear-insurance.html> [<https://perma.cc/2693-2DKT>].

¹⁵⁹ 42 U.S.C. § 2210(b)(1); 10 C.F.R. 140.11(a)(4).

¹⁶⁰ 42 U.S.C. § 2210(b)(4).

If damages from a single accident exceed the two tiers of coverage then Congress shall review reports on the damages prepared by the Secretary of Energy or the NRC and proposals for compensation plans prepared and submitted by the President and “take whatever action is determined to be necessary (including approval of appropriate compensation plans and appropriation of funds) to provide full and prompt compensation to the public for all public liability claims resulting from a disaster of such magnitude.”¹⁶¹ While the provisions regarding the Executive Branch are binding, any action by Congress is totally discretionary.¹⁶²

The CSC was implemented with the Energy Independence and Security Act of 2007.¹⁶³ No major changes were required to the Price-Anderson Act in order to implement the CSC. The first tier of compensation required under the CSC is addressed by nuclear operator private insurance. For incidents not covered by the Price-Anderson Act, U.S. suppliers of nuclear technology would be required to bear the costs of any contribution to the fund because they “stand to benefit from the adoption of harmonized liability rules under the CSC.”¹⁶⁴ Funds normally available under the Price-Anderson Act for incidents within its scope will be used to cover the costs of participating in the CSC system and nuclear suppliers will be required to cover the costs payable by the United States on account of being a party to the CSC for covered incidents outside the United States that are not within the scope of the Price-Anderson Act.¹⁶⁵ Funds made available to the United States under the CSC will be “used to satisfy public liability resulting from the Price-Anderson incident.”¹⁶⁶ The amount of public liability allowable will be increased by the amount of funds made available by the CSC international supplementary fund.¹⁶⁷ Where suppliers are responsible for covering contributions to the international supplementary fund created under the CSC, the amount of the contribution will be assigned to individual suppliers based on a risk-informed assessment

¹⁶¹ 42 U.S.C. § 2210(e), (i).

¹⁶² Lerner & Tanzman, *supra* note 148, at 565.

¹⁶³ 42 U.S.C. § 17001 (2007).

¹⁶⁴ S. EXEC. DOC. NO. 109-15, *supra* note 3, at 7.

¹⁶⁵ 42 U.S.C. § 17373(c), (e) (2007).

¹⁶⁶ 42 U.S.C. § 17373(d)(1).

¹⁶⁷ 42 U.S.C. § 17373(d)(2).

formula.¹⁶⁸ The U.S. Treasury will pay the amount of contribution required for the international supplementary fund and will collect reimbursement from nuclear suppliers.¹⁶⁹

IV. JAPANESE NUCLEAR DAMAGE COMPENSATION SYSTEM

In Japan civil liability for nuclear damage is governed under the 1963 Act on Compensation for Nuclear Damage (ACND).¹⁷⁰ The ACND states that its purpose is “to protect persons suffering from nuclear damage and to contribute to the sound development of the nuclear industry.”¹⁷¹ The ACND defines nuclear damage to mean “any damage caused by the effects of the fission process of nuclear fuel, or of the radiation from nuclear fuel etc., or of the toxic nature of such materials.”¹⁷² The compensation system established by the Act on Compensation for Nuclear Damage is the exclusive remedy for nuclear damage,¹⁷³ and the nuclear operator is solely liable for nuclear damage.¹⁷⁴ Unlike in other systems, no limit is placed on the liability of nuclear operators.¹⁷⁵ Strict liability for nuclear damage is imposed on nuclear operators except where the damage is caused by a grave natural disaster of an exceptional character or by an insurrection.¹⁷⁶ Where the damage is caused by a grave natural disaster of an exceptional character or by an insurrection the Government of Japan “shall take the necessary measures to relieve victims and to prevent the damage from spreading.”¹⁷⁷ Nuclear operators retain a right of recourse against a third party that where the nuclear operator has provided compensation for nuclear damage caused by the willful act of that third party.¹⁷⁸

¹⁶⁸ 42 U.S.C. § 17373(e)(1)(C).

¹⁶⁹ 42 U.S.C. § 17373(h)(1).

¹⁷⁰ ACND, *supra* note 10.

¹⁷¹ ACND, *supra* note 10, art. 1.

¹⁷² ACND, *supra* note 10, art. 2, para. 2.

¹⁷³ ACND, *supra* note 10, art. 4.

¹⁷⁴ ACND, *supra* note 10, art. 4, para. 1.

¹⁷⁵ ACND, *supra* note 10, art. 3–4; Eri Osaka, *The Future of Nuclear Power in East Asia: Corporate Liability, Government Liability, and the Fukushima Nuclear Disaster*, 21 PAC. RIM L. & POL’Y J. 433, 453 (2012).

¹⁷⁶ ACND, *supra* note 10, art. 3, para. 1.

¹⁷⁷ ACND, *supra* note 10, art. 17.

¹⁷⁸ ACND, *supra* note 10, art. 5, para. 1.

As there are no provisions altering the normal law on statutes of limitations in the Act on Compensation for Nuclear Damage plaintiffs are required to bring claims within three years of knowledge of the harm and the identity of the tortfeasor, but not later than twenty years from the date of the harm.¹⁷⁹ This has been extended for toxic torts, however, such that victims simply must bring their claim within the three year period of prescription described above.¹⁸⁰

A nuclear operator must provide ¥ 120 billion of financial security either (a) by maintain a private insurance policy and an indemnity agreement for compensation of certain nuclear damage with the Government of Japan, (b) by providing a deposit of that amount, or (c) by other sufficient financial security approved by the Ministry of Education, Culture, Sports, Science, and Technology (MEXT).¹⁸¹ Under the ACND the Government is required to provide such aid as is required for a nuclear operator to provide compensation for nuclear damage to the extent authorized to do so by the National Diet when the amount of compensation due for nuclear damage exceeds the financial security amount and when the Government “deems it necessary in order to attain the objectives of this Act.”¹⁸² Liability insurance contracts for nuclear damage indemnify a nuclear operator for most loss arising from compensating nuclear damage.¹⁸³ Indemnity agreements for nuclear damage are agreements in which the Government of Japan indemnifies a nuclear operator for loss arising from compensating nuclear damage not covered by the liability insurance contract or other financial security for compensation of nuclear damage, such as damages due to normal operations, volcanos and earthquakes, and damages otherwise covered by private insurance but not claimed within ten years of the nuclear accident.¹⁸⁴

¹⁷⁹ Minpō (民法) [Civ. C.], Law No. 89 of 1896, art. 724 (Japan); Osaka, *supra* note 175, at 449.

¹⁸⁰ Saikō Saibansho [Sup. Ct.], Apr. 27, 2004, Hei 13 (uke) no. 1760, 58(4) Saikō Saibansho Minji Hanreishū [Minshū] 1032 (Japan); *See also* Osaka, *supra* note 175, at 449.

¹⁸¹ ACND, *supra* note 10, art. 7, para. 1.

¹⁸² ACND, *supra* note 10, art. 16.

¹⁸³ ACND, *supra* note 10, art. 8.

¹⁸⁴ ACND, *supra* note 10, art. 10; Genshiryoku Songai Baishō Hoshō Keiyaku ni kansuru Hōritsu (原子力損害賠償補償契約に関する法律) [Act on Indemnity Agreements for the Compensation of Nuclear Damage], Law No. 148 of 1961, art. 2 (Japan), <http://law.e-gov.go.jp/htmldata/S36/S36HO148.html> [https://perma.cc/E32C-MFHT] [hereinafter Indemnity Agreements Act].

In response to the multi-trillion yen damages caused by the Fukushima Daiichi incident, Japan passed the Nuclear Damage Compensation and Decommissioning Facilitation Corporation Act in 2011.¹⁸⁵ The Act created a fund to provide aid to TEPCO, and other future nuclear operations that have liability for nuclear damage exceeding the amount of financial security required of them, so that it would be able to pay out all compensation for which it was liable rather than face liquidation due to the large amount of claims for nuclear damage.¹⁸⁶ The shareholders of the corporation are the Government of Japan and other non-governmental persons, including nuclear operators, though nuclear operators are not required to become shareholders.¹⁸⁷ The current shareholders of the Corporation include the Government of Japan, which invested ¥ 7 billion, and nuclear operators including TEPCO, which also invested ¥ 7 billion.¹⁸⁸ Under the Compensation Corporation Act nuclear operators pay annual premiums and will be able to request funds to pay compensation claims without any obligation to repay the Compensation Corporation.¹⁸⁹ The Compensation Corporation may also provide additional assistance to nuclear operators, such as loans.¹⁹⁰ Also, the Government is authorized to issue interest-free, non-transferable bonds to the corporation which can be redeemed to ensure availability of funds to provide financial assistance to a nuclear operator in the event of an accident that causes damages so large the Corporation does not have sufficient funds to provide aid to a nuclear operator.¹⁹¹ A nuclear operator receiving financial assistance in this manner will be required to pay an additional contribution on top of its normal annual contribution.¹⁹² Where a

¹⁸⁵ ACND, *supra* note 10, art. 16; Genshiryoku Songai Baishō Hairo Tō Shien Kikō Hō (原子力損害賠償・廃炉等支援機構法) [Nuclear Damage Compensation and Decommissioning Facilitation Corporation Act] Law No. 94 of 2011, art. 2 (Japan), <http://law.e-gov.go.jp/htmldata/H23/H23HO094.html> [https://perma.cc/VN87-PTKN] [hereinafter Compensation Corporation Act]; *see also* Osaka, *supra* note 175, at 442.

¹⁸⁶ Osaka, *supra* note 175, at 442.

¹⁸⁷ Compensation Corporation Act, *supra* note 185, art. 4.

¹⁸⁸ Kikō no Gaiyō (機構の概要) [Summary of [the] Structure [of the Nuclear Damage Compensation and Facilitation Corporation], NUCLEAR DAMAGE COMPENSATION AND FACILITATION CORPORATION, http://www.ndf.go.jp/soshiki/kikou_gaiyou.html [https://perma.cc/2KL8-DBSH] (last visited Jan. 15, 2017).

¹⁸⁹ Compensation Corporation Act, *supra* note 185, art. 38, 39, 41.

¹⁹⁰ Compensation Corporation Act, *supra* note 185, art. 41.

¹⁹¹ Compensation Corporation Act, *supra* note 185, art. 45, 48–49.

¹⁹² Compensation Corporation Act, *supra* note 185, art. 52.

corporation receives aid in this manner it must prepare a “special business plan” jointly with the Corporation, which includes measures for rationalization of the nuclear operator’s operations.¹⁹³

Two laws were passed in 2014 in order to implement changes to Japanese law required for ratification of the CSC, the Act on Assistance, etc., for the Nuclear Damage Compensation Fund pursuant to the Implementation of the Convention on Supplementary Compensation for Nuclear Damage and the Act Amending Certain Provisions of the Act on Compensation of Nuclear Damage and the Act on Indemnity Agreements for the Compensation of Nuclear Damage.¹⁹⁴

Under the CSC Assistance Act, the Government will provide financial assistance to a nuclear operator where the amount of nuclear damages suffered in the territory of a party to the CSC or suffered by a national of a party to the CSC is above 300 million SDR when jurisdiction over the claim lies with the courts of Japan.¹⁹⁵ The amount of aid is the lesser of the amount of compensation payable by a nuclear operator under the CSC in excess of 300 million SDR and the amount payable by Japan as its contribution to the international supplementary compensation fund, plus interest and costs.¹⁹⁶ The Government collects regular annual deposits of ¥170,400,000 from

¹⁹³ Compensation Corporation Act, *supra* note 185, art. 45.

¹⁹⁴ Genshiryoku Songai no Hokantekina Hoshō ni kansuru Jōyaku no Jisshi ni tomonau Genshiryoku Songai Baishō Shikin no Hojo Tō ni kansuru Hōritsu (原子力損害の補完的な補償に関する条約の実施に伴う原子力損害賠償資金の補助等に関する法律) [Act on Assistance, etc., for the Nuclear Damage Compensation Fund pursuant to the Implementation of the Convention on Supplementary Compensation for Nuclear Damage], Law No. 133 of 2014 (Japan) [hereinafter CSC Assistance Act]; Genshiryoku Songai no Baishō ni kansuru Hōritsu oyobi Genshiryoku Songai Baishō Hoshō Keiyaku ni kansuru Hōritsu no Ichibu wo Kaisei suru Hōritsu (原子力損害の賠償に関する法律及び原子力損害賠償補償契約に関する法律の一部を改正する法律) [Act Amending Certain Provisions of the Act on Compensation of Nuclear Damage and the Act on Indemnity Agreements for the Compensation of Nuclear Damage], Law No. 134 of 2014 (Japan), http://www.shugiin.go.jp/internet/itdb_housei.nsf/html/housei/18720141128134.htm [<https://perma.cc/JMY9-R2J2>] [hereinafter CSC Amendments Act].

¹⁹⁵ CSC Assistance Act, *supra* note 194, art. 3; Genshiryoku Songai no Hokantekina Hoshō ni kansuru Jōyaku no Jisshi ni tomonau Genshiryoku Songai Baishō Shikin no Hojo Tō ni kansuru Hōritsu Shikōrei (原子力損害の補完的な補償に関する条約の実施に伴う原子力損害賠償資金の補助等に関する法律施行令) [Cabinet Order Implementing the Act on Assistance, etc., for the Nuclear Damage Compensation Fund pursuant to the Implementation of the Convention on Supplementary Compensation for Nuclear Damage], Cabinet Order No. 173 of 2015 (Japan), <http://law.e-gov.go.jp/htmldata/H27/H27SE173.html> [<https://perma.cc/33CG-JZUA>] [hereinafter CSC Assistance Act Cabinet Order].

¹⁹⁶ CSC Assistance Act Cabinet Order, *supra* note 195, art. 2.

nuclear operators for the purpose of satisfying any obligation under the CSC to make a contribution to the international supplementary fund.¹⁹⁷ The Government will also collect a special deposit from a nuclear operator equal to the amount required as a contribution to the international supplementary compensation fund by Japan.¹⁹⁸

The changes to Japanese law under the CSC Amendments Act to bring Japanese law with the Annex of the CSC were minimal as Japanese law largely was largely already in conformance. The most significant change is that after the amendment operators have a right of recourse only when nuclear damage was caused by the willful act of a natural person, not any third party as under previous law, or where there is express provision for a right of recourse in a written agreement.¹⁹⁹

V. ANALYSIS OF THE CSC'S PROVISIONS

Having previously noted how low membership in the CSC limits its utility, this section will analyze how well the provisions of the CSC accomplish their objectives of ensuring adequate victim compensation while shielding nuclear operators from unsustainable levels of potential liability, in particular regarding the largest users of nuclear power in the CSC, the United States and Japan. As described above, the CSC follows prior practice in the Paris and Vienna Conventions of applying strict and exclusive liability for nuclear operators, employing these same core mechanisms to shield the nuclear industry as a whole from liability and concentrating it on the nuclear operator. The CSC was formulated to address criticisms of the original Paris and Vienna Conventions regarding low liability limits, the lack of a supplementary compensation fund, short statutes of limitations, overly restrictive types of covered damages, and limited territorial scope.²⁰⁰ The CSC is the implementation of the need for a supplementary compensation fund. This section will examine several critiques of the CSC involving: definition of damages, limitations on liability, legal channeling, statutes of

¹⁹⁷ CSC Assistance Act, *supra* note 194, art. 4; CSC Assistance Act Cabinet Order, *supra* note 195, art. 3.

¹⁹⁸ CSC Assistance Act, *supra* note 194, art. 10, 11; CSC Assistance Act Cabinet Order, *supra* note 195, art. 5.

¹⁹⁹ CSC Amendments Act, *supra* note 194, art. 1.

²⁰⁰ Currie, *supra* note 4, at 107.

limitations, and jurisdiction over claims. This paper argues that the CSC will likely prove to have little impact on domestic victims in either the United States or Japan because it does not substantially increase the amount of compensation available or make compensation particularly easier to obtain. The CSC would, however, improve the availability of compensation in many nations considering nuclear power that currently heavily limit industry liability.

A. Definition of Damages

Under the original Paris and Vienna Conventions nuclear damages were restricted to loss of life, personal injury and damage to property.²⁰¹ The Revised Vienna Convention and the CSC greatly expanded the definition of nuclear damages to include a variety of economic and environmental damages to the extent allowed by the law of the competent court as described above.²⁰² Despite this expanded definition, critics of the CSC and the other Conventions attack the definition of damages for being overly restrictive, and, in the case of Japan, are concerned that ratification of the CSC will eliminate several types of damage currently included in compensable damages.²⁰³

As Japanese law currently allows all damages proved to be caused by a nuclear accident, the more restrictive CSC definition does somewhat limit compensable damages.²⁰⁴ The Japan Federation of Bar Associations is specifically concerned that the CSC definition does not explicitly include emotional damages or damages from harmful rumors.²⁰⁵ While the CSC definition does not specifically include rumor damages, scholarly consensus is that both of these types of damage will still be included in cases subject to Japanese law. Japanese jurisprudence allows for the compensation of pure economic damages without any harm to person or property, such as so called rumor damages, “where the desire of a consumer or business partner to avoid [doing business with the plaintiff] out of concern for the danger of contamination by radioactive substances on account of

²⁰¹ Paris Convention, *supra* note 14, art. 1; Vienna Convention, *supra* note 16, art. 1(j).

²⁰² CSC, *supra* note 1, art. 1(f)(iii–vii).

²⁰³ Currie, *supra* note 4, at 85; August 2014 JFBA opinion, at 1.

²⁰⁴ ACND, *supra* note 10, art. 3.

²⁰⁵ August 2014 JFBA opinion, *supra* note 4, at 4.

the present accident is deemed reasonable by the standard of an average or regular person.”²⁰⁶ The CSC definition of nuclear damages leaves room for claims brought under Japanese law to include rumor damages in the scope of compensable damages in under art. I(f)(vii) (“any other economic loss, other than any caused by the impairment of the environment, if permitted by the general law on civil liability of the competent court”).²⁰⁷

Regarding emotional harms, the fact that the CSC includes personal injury in the definition of nuclear damage while the other conventions on the compensation of nuclear damage refer to bodily injury could be interpreted to mean that the more expansive term personal injury is intended to include both purely physical harms and emotional harms.²⁰⁸

In addition, some argue that damages should be further expanded to include rumor damages even where no measurable radioactivity has been released,²⁰⁹ and fully integrate economic and environmental damages regardless of the law of the competent court.²¹⁰ Others criticize the CSC definition for being too broad, saying that including pure economic damages in the scope of nuclear damages makes it harder for victims that suffered personal injury or property damage to recover the full amount of recoverable damages unless the financial resources of the nuclear operator are unlimited.²¹¹

²⁰⁶ Otsuka Tadashi (大塚直), *Fukushima Dai'ichi Genshiryoku Hatsudensho Jiko ni yoru Songai Baishō* (福島第一原子力発電所事故による損害賠償) [*Compensation for the Fukushima Daiichi Nuclear Power Plants Accident*], in *Shinsai • Genpatsu Jiko to Kankyō Hō* (震災・原発事故と環境法) [EARTHQUAKES, NUCLEAR ACCIDENTS AND ENVIRONMENTAL LAW] 79 (Shigeru Takahashi & Tadashi Otsuka eds. 2013) (citing NAGOYA Kōtō Saibansho Kanazawa Shibu [NAGOYA HIGH CT. KANAZAWA BRANCH] May 17, 1989, 1322 HANREI JIHŌ (判例時報) 99).

²⁰⁷ NIHON ENERUGI-HŌ KENKYŪJO (日本エネルギー法研究所) [JAPAN ENERGY LAW INSTITUTE], *GENSHIRYOKU SONGAI NO HOKANTEKI HOSHŌ NI KANSURU JŌYAKU KAKU JŌ NO KAISETSU OYOBI HŌTEKI MONDAITEN NO KENTŌ* (原子力損害の補完的補償に関する条約各条の解説及び法的問題点の検討) [EXPLANATION OF THE PROVISIONS OF THE CONVENTION ON SUPPLEMENTARY COMPENSATION OF NUCLEAR DAMAGE AND STUDY OF LEGAL ISSUES], no. 126, at 14 (2012), http://www.jeli.gr.jp/report/jeli-R-126@2012_11_CSC.pdf [<https://perma.cc/T3KC-97F5>] [hereinafter JELI no. 126].

²⁰⁸ *Id.* at 5.

²⁰⁹ Jon M. Van Dyke, *Liability and Compensation for Harm Caused by Nuclear Activities*, 35 DENV. J. INT'L L. & POL'Y 13, 36 (2006).

²¹⁰ Currie, *supra* note 4, at 86.

²¹¹ Niimi Ikufumi (新美育文), *Genpatsu Jiko to Songai Baishō Hō* (原発事故と損害賠償法) [*Nuclear Accidents and Compensation Law*], in *SHINSAI • GENPATSU JIKO TO KANKYŌ HŌ* (震災・原発事故と環境法) [EARTHQUAKES, NUCLEAR ACCIDENTS AND ENVIRONMENTAL LAW] 142–43 (Shigeru Takahashi & Tadashi Otsuka eds. 2013).

In summary, the definition of damages of the CSC and the Revised Vienna Convention is much more protective of victims than the definition currently used in the un-amended Paris Convention, though the range of compensable damages could be further expanded, and concerns about reduced coverage in Japan are largely unfounded.

B. Limitations on Liability

Limits on liability have been put in place to prevent nuclear operators from shouldering the full cost of insuring their liabilities and inability to compensate any damages due to bankruptcy.²¹² These limitations on the liability of nuclear operators have a distorting effect because they allow nuclear operators to avoid fully internalizing the costs of their operations.²¹³ Nevertheless, it is unlikely that international agreements can raise the minimum limits on the amount of compensation to a level that would ensure full compensation of the largest nuclear accidents and that this can be addressed mainly through national law. While the 1990s era Conventions with minimum liability amounts of 300 million SDR would be sufficient to cover an accident the size of the Three Mile Island accident with damages of \$70 million,²¹⁴ the Conventions have been roundly criticized for adopting minimum compensation amounts that are substantially lower than would be required to actually compensate a major nuclear accident like Chernobyl or Fukushima.²¹⁵ The World Health Organization estimates the damages from Chernobyl will be in the range of hundreds of billions of dollars, though notes that the amount is not possible to accurately calculate.²¹⁶ Damages from Fukushima have already exceeded ¥ 4 trillion.²¹⁷

²¹² Currie, *supra* note 4, at 91.

²¹³ Faure & Borre, *supra* note 143, at 264.

²¹⁴ U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-04-654, NRC'S LIABILITY INSURANCE REQUIREMENTS FOR NUCLEAR POWER PLANTS OWNED BY LIMITED LIABILITY COMPANIES 5 (2004), <http://www.gao.gov/new.items/d04654.pdf> [<https://perma.cc/W9QQ-2QDE>].

²¹⁵ Van Dyke, *supra* note 209, at 35 (describing the current limits on damages "grossly inadequate"); August 2014 JFBA Opinion, *supra* note 4, at 4–5.

²¹⁶ *Chernobyl: The True Scale of the Accident*, WORLD HEALTH ORG. (Sep. 5, 2005), <http://www.who.int/mediacentre/news/releases/2005/pr38/en/> [<https://perma.cc/3QQN-N2YR>].

²¹⁷ House of Councilors Report, *supra* note 3, at 52.

Limitations on the monetary amount of damages and the plaintiffs who are allowed to bring claims have increased from the Paris Convention's upper limit of \$15 million to a first tier of at least 300 million SDR and a second tier of up to 300 million SDR in the CSC and Revised Vienna Convention.²¹⁸ However, this is still considerably lower than the \$12.9 billion available in the United States.²¹⁹ Japan has an unlimited liability system, but even the primary insurance requirement of ¥ 120 billion is considerably higher than the CSC minimum amount.²²⁰ Above that amount compensation is addressed through direct government aid or through the Compensation Corporation in the form of payouts and loans.²²¹ The Revised Paris Convention proposed to increase the minimum limit on liability to € 700 million, and combined with the Revised Brussels Supplementary Convention the total amount of available funds would have been € 1.5 billion, but there is no sign that this will be ratified at any point.²²²

Industry groups are very much in favor of limited liability, and in Japan are pushing for a change from unlimited to limited liability, saying that industry and the public should share the risks of nuclear power and that unlimited liability will prevent full compensation of damages.²²³ However limitations on liability should only be necessary if nuclear operators are poorly capitalized and are unable to shoulder the increase in insurance costs under an unlimited liability system.²²⁴ Furthermore this punishes the victims of nuclear accidents not the party that caused the accident.²²⁵ Indeed, the trend

²¹⁸ Paris Convention, *supra* note 14, art. 7; Vienna Convention, *supra* note 16, art. 5; CSC, *supra* note 1, art. 3.

²¹⁹ *Backgrounder on Nuclear Insurance and Disaster Relief*, NUCLEAR REG. COMM'N (Dec. 12, 2014), <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/nuclear-insurance.html> [<https://perma.cc/WE4Y-H63H>].

²²⁰ ACND, *supra* note 10, art. 7, para. 1.

²²¹ ACND, *supra* note 10, art. 16; Compensation Corporation Act arts. 38, 39, 41, 45, 48–49.

²²² 2004 Protocol to Amend Paris Convention, *supra* note 14, art. 1(H); 2004 Protocol to Amend Brussels Supplementary Convention, *supra* note 38, art. 3.

²²³ SAWA AKIHIRO & TAKEUCHI SUMIKO (澤昭裕 & 竹内純子), 21 SEIKI SEISAKU KENKYUJO (21 世紀政策研究所) [THE 21ST CENTURY PUBLIC POLICY INSTITUTE], GENSHIRYOKU JIGYŌ KANKYŌ TAISEI SEIBI NI MUKETE (原子力事業環境・体制整備に向けて) [TOWARD A COMPREHENSIVE SOLUTION FOR NUCLEAR POLICY AND BUSINESS CHALLENGES] 37 (2013), http://www.21ppi.org/pdf/thesis/131114_02.pdf [<https://perma.cc/FV8A-QMS8>].

²²⁴ Currie, *supra* note 4, at 91.

²²⁵ *Id.*

has been for states to move away from limited liability, beginning with Germany in 1985.²²⁶ However at the urging of industry groups, Japan is considering moving the opposite direction to transition from unlimited liability to either a limited liability system or imposing a statutory cap on liability above which the government will provide compensation as a reaction to the massive costs imposed by the Fukushima accident.²²⁷ One interesting proposal is to add a second layer of coverage based on the Price-Anderson model of retroactive premiums, but making the amount of the fund scalable up to ¥ 3 trillion to ¥ 4 trillion above which the government would be responsible for providing compensation.²²⁸ Critics of Japan's current system, such as Prof. Urakawa, note that unlike other unlimited liability systems, Japan does not have clear rules on when government assistance will be provided, impeding risk management.²²⁹ He notes that the current system based on the Compensation Corporation creates a never ending compensation process that holds back the recovery of both victims and TEPCO and other members of the nuclear industry.²³⁰

While the CSC's minimum liability amounts are lower than those in the United States and Japan, other Asian countries at present limit liability to less than the CSC minimum amount. For example, China, which Japan has encouraged to join the CSC,²³¹ only provides 800 million RMB of coverage, though additional indemnity may be provided for an extraordinary nuclear accident.²³² Adoption of the

²²⁶ Currently Austria, Germany, Japan and Switzerland apply unlimited liability. Schwartz, *supra* note 2, at 59.

²²⁷ SAWA & TAKEUCHI, *supra* note 223, at 37.

²²⁸ SAWA & TAKEUCHI, *supra* note 223, at 34.

²²⁹ Urakawa Michitarō (浦川道太郎), *Genbairō no Mukashitsu Songai Baishō Seido to Genpatsu Higaisha Kyūsai no Arikata* (原賠法の無過失損害賠償制度と原発被害者救済の在り方) [*The Act on Compensation of Nuclear Damage Strict Liability Damage Compensation System and the Future of Assistance to Victims of Nuclear Damage*], in 21 SEIKI SEISAKU KENKYŪJO (21 世紀政策研究所) [THE 21ST CENTURY PUBLIC POLICY INSTITUTE], ARATANA GENSIRYOKU SONGAI BAISHŌ SEIDO NI MUKETE (新たな原子力損害賠償制度の構築に向けて) [TOWARD THE ESTABLISHMENT OF A NEW COMPENSATION SYSTEM FOR NUCLEAR DAMAGES] 157 (Sawa Akihiro ed. 2013), http://www.21ppi.org/pdf/thesis/131114_01.pdf [<https://perma.cc/F7EH-W9A5>].

²³⁰ *Id.* at 160.

²³¹ House of Councilors Report, *supra* note 3, at 52–53.

²³² Guowuyuan (国务院) [State Council of the People's Republic of China], Guowuyuan Guanyu Chuli Disanfang He Zeren Wenti Gei He Gongye Bu, Guojia He Anquan Ju, Guowuyuan Hedian Lingdao Xiaozu de Pifu (国务院关于处理第三方核责任问题给核工业部、国家核安全局、国务院核电领导小组的批复) [Reply of the Council

CSC would require increases in the amount of damages nuclear operators are liable for and would in that sense increase the amount of compensation available to potential victims.

Furthermore, the CSC provides for two exceptions to liability for nuclear operators: for nuclear damage directly due to an act of armed conflict, hostilities, civil war or insurrection and for damage directly due to a grave natural disaster of an exceptional character, except where the law of the installation state provides otherwise.²³³ The exception for grave natural disasters of an exceptional character has been removed from the Revised Paris and Vienna Conventions.²³⁴ This provision obstructs victim compensation for what could be the most damaging nuclear accidents to the extent the government does not provide compensation in place of the nuclear operator.²³⁵ In the United States, the Price-Anderson Act specifically requires nuclear operators to waive force majeure defenses to liability.²³⁶ Japan however grants an exception to liability for grave natural disasters of an exceptional character.²³⁷ However, the bar for how uncommon the disaster must be is quite high, with the standard being something in the range of completely unimaginable.²³⁸ This rather restricts the applicability of this provision, and even the 2011 Great East Japan Earthquake was determined to not meet this standard.²³⁹

Despite the disadvantages of limited liability, international agreements are not likely to be a successful method of addressing the issue. Potential state parties are simply unlikely to be willing to change their policy through international dialogue. Progress has been

to the Ministry of Nuclear Industry, National Nuclear Safety Bureau and the State Council Atomic Energy Board in respect of Resolving Third Parties' Nuclear Liability] (1986) (China), <http://wap.cnki.net/qikan-GWYB198609002.html> [<https://perma.cc/FJ7N-N5GT>]; Guowuyuan (国务院) [State Council of the People's Republic of China], Guowuyuan Guanyu He Shigu Sunhai Peichang Zeren Wenti de Pifu (国务院关于核事故损害赔偿责任的批复) [Official Reply of the State Council to Questions on the Liabilities of Compensation for Damages Resulting From Nuclear Accidents] (2007) (China), http://www.oecd-nea.org/law/nlb/nlb-80/documents/103_104_TextChina.pdf [<https://perma.cc/R27N-KL87>]; Jing Liu & Michael Faure, *Compensating Nuclear Damage in China*, 11 WASH. U. GLOBAL STUD. L. REV. 781, 808 (2012).

²³³ CSC, *supra* note 1, Annex art. 3(5).

²³⁴ 1997 Revised Vienna Protocol, *supra* note 38, art. 6; 2004 Protocol to Amend Paris Convention, *supra* note 38, art. 1(J).

²³⁵ Currie, *supra* note 4, at 87.

²³⁶ 42 U.S.C. § 2014 (n); 10 C.F.R. 140.91.

²³⁷ ACND, *supra* note 10, art. 3, para. 1.

²³⁸ Otsuka, *supra* note 206, at 69.

²³⁹ *Id.*

seen is in the removal of the exception for grave natural disasters of an exceptional character and the CSC has a substantially greater minimum liability amount, but the Revised Vienna Convention was only ratified by 13 of the 40 Vienna Convention parties.²⁴⁰ The purpose of international agreements on liability for nuclear damages is to coordinate jurisdiction and ensure coverage of transnational damages.²⁴¹ While in regions like Europe with many small countries closely packed together there is a greater risk of transboundary damages, victims in the United States or Japan are far more likely to be injured in purely domestic accidents. For them, limits on liability are above all a matter for domestic discussion. Furthermore, Japan has managed to provide compensation far beyond the amount of financial security required of nuclear operators through the innovative, if perhaps clunky, system of the Compensation Corporation. The effects of nuclear damages are primarily felt in relatively close proximity to the site of the accident. Pressure to ensure adequate compensation should therefore be strongest domestically.

C. Legal Channeling

Further innovations should be expected at the level of domestic law. While legal channeling is the norm internationally, it is not an efficient way of compensating victims. Legal channeling is yet another way in which the nuclear industry, in particular manufacturers, shields itself from liability and avoids economically efficient internalization of costs.²⁴² While legal channeling decreases the administrative costs of concurrent lawsuits, it does not outweigh the benefits to efficiency of allowing a victim to sue all possible parties for a given harm.²⁴³ The economic channeling used in the United States is more efficient because it reduces administrative costs by requiring operators to include all possible third parties into the operator's coverage while still allowing victims to choose from the full range of possible defendants.²⁴⁴ The United States long rejected joining any Convention which would have required it to abandon

²⁴⁰ Vienna Convention Latest Status, *supra* note 17.

²⁴¹ Schwartz, *supra* note 2, at 41.

²⁴² Faure & Borre, *supra* note 143, at 464.

²⁴³ *Id.* at 465.

²⁴⁴ *Id.*

economic channeling.²⁴⁵ The CSC is therefore the better option for the United States as compared to the Paris Convention or Vienna Convention, which would have required the United States to adopt economic channeling. Unfortunately, this exception to the requirement of implementing legal channeling is part of the CSC's provisions exempting the United States from certain requirements with which national legislation must conform.²⁴⁶ This does little good for other parties to the CSC.

D. Statute of Limitations

Another criticism of the CSC is that its statute of limitations is too short for the radiological harms caused by nuclear damage and that time limits on the bringing of claims should be eliminated entirely.²⁴⁷ The CSC requires that states implement law requiring claims be brought within three years of knowledge of the harm and identity of the tortfeasor but not longer than 10 years, however if under national law the liability of the operator is covered by insurance or other financial security for a longer period, then the statute of limitations can be extended correspondingly.²⁴⁸ This is shorter than provided for under U.S. law (20 years) or Japanese law (20 years by statute, but courts have extended this as noted above).²⁴⁹ For comparison, the Revised Paris and Vienna Conventions extend their statute of limitations all the way to 30 years.²⁵⁰ While the statute of limitations in the CSC is shorter than is provided for under U.S. or Japanese law, this provision will have no effect on the United States or Japan because the financial security requirements cover longer periods.

²⁴⁵ 1999 DOE Report, *supra* note 19, at 25.

²⁴⁶ CSC, *supra* note 1, Annex art. 2.

²⁴⁷ August 2014 JFBA opinion, *supra* note 4, at 5; Van Dyke, *supra* note 209, at 36.

²⁴⁸ CSC, *supra* note 1, Annex art. 9.

²⁴⁹ 42 U.S.C. § 2014 (n); 10 C.F.R. 140.91; Minpō (民法) [Civ. C.], Law No. 89 of 1896, art. 724 (Japan); Saikō Saibansho [Sup. Ct.], Apr. 27, 2004, Hei 13 (uke) no. 1760, 58(4) Saikō Saibansho Minji Hanreishū [Minshū] 1032 (Japan).

²⁵⁰ 1997 Revised Vienna Protocol, *supra* note 52, art. 8; 2004 Protocol to Amend Paris Convention, *supra* note 38, art. 1(I).

E. Jurisdiction over Claims

Another major criticism of the CSC and the other Conventions is that they provide for exclusive jurisdiction over claims in the courts of the country in which they occurred.²⁵¹ Criticism of this provision focuses on two matters. First, some, such as the JFBA, see this as disadvantaging victims in countries such as Japan that would need to pursue claims in distant countries which may have only the minimum provisions required under the CSC.²⁵² In advanced countries, such as the United States and Japan, legal protections are substantially stronger than the minimum provisions required by international treaty. The situation in developing countries is rather different as illustrated in the discussion of limitations on damages.

Second some, such as Prof. Currie, criticize the lack of neutral tribunals.²⁵³ The CSC and other agreements require that compensation be provided without discrimination on the basis of nationality, domicile or residence.²⁵⁴ Prof. Currie is concerned about forcing victims to sue in a court of a state economically linked to its own nuclear industry.²⁵⁵ He further argues for the application of the law of the place in which the damage occurred, not where the accident took place, because it is clear that there is a risk of damage in distant locations and victims are justified in relying on the safety standards of their own country.²⁵⁶

On the other hand, it can also be noted, perhaps rather cynically, that from the perspective of a country like Japan which is more likely to be the location of an accident than a victim of transnational damage from a neighbor,²⁵⁷ it may be beneficial to be

²⁵¹ CSC, *supra* note 1, art. 13(1).

²⁵² August 2014 JFBA opinion, *supra* note 4, at 5.

²⁵³ Currie, *supra* note 4, at 85.

²⁵⁴ CSC, *supra* note 1, art. 3(2)(a).

²⁵⁵ Currie, *supra* note 4, at 95.

²⁵⁶ *Id.* at 97.

²⁵⁷ Takeuchi Sumiko (竹内純子), *Wagakuni no Genshiryoku Jigyō no Rekishi to Genshiryoku Songai Baishō Seido no Seitei Kei* (我が国の原子力事業の歴史と原子力損害賠償制度の制定経緯) [*The Historical Context of Nuclear Operations and Nuclear Damage Compensation in Japan*], in 21 SEIKI SEISAKU KENKYŪJO (21 世紀政策研究所) [THE 21ST CENTURY PUBLIC POLICY INSTITUTE], ARATANA GENSHIRYOKU SONGAI BAISHŌ SEIDO NO KŌCHIKU NI MUKETE (新たな原子力損害賠償制度の構築に向けて) [TOWARD THE ESTABLISHMENT OF A NEW COMPENSATION SYSTEM FOR NUCLEAR DAMAGES] 51 (Sawa Akihiro ed. 2013), http://www.21ppi.org/pdf/thesis/131114_01.pdf [<https://perma.cc/F7EH->

protected by provisions that require that claims be brought in your own courts.

VI. REFORM EFFORTS

In 2012 the IAEA's International Expert Group on Nuclear Liability (INLEX) made recommendations on how the international community should adjust the system for compensating nuclear damages in the aftermath of the Fukushima accident.²⁵⁸ The report strongly recommended that states with nuclear reactors ratify at least one of the Conventions, and encouraged states with no reactors to consider joining a Convention to receive the benefits of ensuring compensation for transnational nuclear damage.²⁵⁹ The report specifically recommended that states with nuclear installations ensure the availability of funds to compensate all victims of a nuclear incident, without discrimination. Such states should: "establish compensation and financial security amounts significantly higher than the minimum amounts envisaged under the existing instruments," "undertake regular reviews of the adequacy of compensation amounts . . . ," "undertake regular reviews of the adequacy of financial security amounts . . . ," "be prepared to set up alternative funding mechanisms where the amount of damage exceeds the available compensation and financial security," "provide compensation for latent injuries, " "ensure that compensation is available in the case of an incident directly due to a grave natural disaster of an exceptional character," and "ensure that all claims from a nuclear disaster are dealt with in a single forum in a prompt, equitable, and non-discriminatory manner with minimal litigation" ²⁶⁰

These recommendations address the issues with the provisions of the CSC raised in this paper. Monetary limits on liability have gradually increased but are still insufficient to cover a

W9A5] (noting the concern of Japan's neighbors about transnational damage from a nuclear accident in Japan).

²⁵⁸ RECOMMENDATIONS ON HOW TO FACILITATE ACHIEVEMENT OF A GLOBAL NUCLEAR LIABILITY REGIME, AS REQUESTED BY THE IAEA ACTION PLAN ON NUCLEAR SAFETY, INT'L EXPERT GROUP ON NUCLEAR LIABILITY (INLEX) (Aug. 15, 2012) [hereinafter INLEX Recommendations], <http://ola.iaea.org/ola/documents/ActionPlan.pdf> [<https://perma.cc/7B3A-KYHR>].

²⁵⁹ *Id.* at 3.

²⁶⁰ *Id.* at 3–4.

large accident. Concerns remain about the advisability of allowing national courts to adjudicate claims where the nuclear industry is a major stakeholder in the national economy. This paper has discussed how the international forum is not the best place to assure compensation to all domestic victims of a nuclear accident, though it is the only way to assure compensation to victims of nuclear damage caused by an accident in a foreign country. We have seen that Japan had to enact extraordinary measures to assure compensation for the Fukushima accident because it only required ¥ 120 billion of financial security despite the unlimited liability faced by its nuclear operators. However, Japan successfully innovated to develop a novel method for compensating the victims of the Fukushima accident. These recommendations, however, show no indication that there will be any change to the use of legal channeling.

In conclusion, in the existing treaties the protection of the nuclear industry from liability is prioritized over ensuring adequate victim compensation. However, the issue of civil liability for nuclear damages, in particular transnational damages, is likely to become more pressing. At present, there are 60 new nuclear reactors under construction, half of which are in Asia.²⁶¹ Of these, 20 are in China, which is not party to any of the Conventions, has most of its provisions on compensation for nuclear damage only in administrative law, and provides for only minimal amounts of operator liability as compared to the CSC or Revised Vienna Convention.²⁶² Innovation on the international stage has tended to follow major accidents. There can be little question that there will be future accidents. We shall see how the current framework holds up and evolves should there be another accident like Chernobyl with substantial transnational damages.

²⁶¹ *Operational Reactors by Country*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Feb. 14, 2016), <https://www.iaea.org/PRIS/WorldStatistics/OperationalReactorsByCountry.aspx> [https://perma.cc/ENE3-AME8].

²⁶² *Operational Reactors by Country*, INT'L ATOMIC ENERGY AGENCY [IAEA] (Feb. 14, 2016), <https://www.iaea.org/PRIS/WorldStatistics/OperationalReactorsByCountry.aspx> [https://perma.cc/ENE3-AME8]; Liu & Faure, *supra* note 232, at 796.